This listing of claims presented below replaces all prior versions and listings of claims in this application.

Listing of Claims

1. (Withdrawn) Genetic sequence corresponding to SEQ ID NO:1 comprising at least one of the following mutations: (-23)A>C, 1054 del11, 108delC, 1197de19, 1207de1T, 1432delG, 191-2delAinsCT, 2184delG, 231delC, 2399del5ins4, 313+linsT, 338dell6, 509insC, 675dell5, 684dup12, 941-39>T, C195R, C255G, C319Y, D157G, D630N, E291X, H635N, N59K, T41M, W515X, Y379X, Y421X, T433N, 818de18, 1423delGC/insA, 1204insT, 451de13, G516X, 2389+4A>G, 1815del11, 1186+5G>A, T740M, I771T, R279G, T446I, H562Q, C74Y, D686Y, G(-2)R, E579D, S205C, D200V, V766E, L(-6)P, 2544insC, C42Y, 2389+3A>C, [1587-5de15;1587del31], of application in extracorporeal and in vitro diagnostic methods for familial hypercholesterolemia.

2. (Withdrawn) Genetic sequence according to claim 1, furthermore comprising any of the following mutations: 2393del9, (-42)C>G, (-49)C>T, 1045delC, 1061-8 T>C, A378T, C358R, 1358+1G>A, 1706-10G>A, 1845+1G>C, 2085del19, 2lldelG, 2140+5G>A, 2207insT, 2390-1G>C, 313+1G>C, 313+1G>A, 518delG, 7delC, 872delC, 884delT, 920ins4, A519T, C113W, C255X, C281Y, C297F, C347Y, C371X, C646Y, C677Y, C68W, C74G, C95R, D151N, D200G, D200Y, D280G, E10X, E246A, E256K, F634L, G322S, G352D, G571E, N543H, N804K, Q12X, Q133X, Q357P, Q427X, Q71E, R395Q, R574W, R612C, S156L, S205P, T413K, T7051, V502M, W(-18)X, W541X, D679E, 1359-1G>A, C127R, 681ins21, C122X, V408M, G528D, D412H, N619N, E80K, L534P, L621S, C356Y, R329X, G248D, C201Y, 313+5G>A, C358Y, C331R, D157N, V776M, P664L, W462X,

Q328X, L584P, R395W, G314V, W469X, P678L, R612H, R236W, of application in extra-+-corporeal and in vitro diagnostic methods, of familial hypercholesterolemia.

3. (Withdrawn) Gene sequence according to either of claims 1 or 2 comprising, moreover, any of the following polymorphisms: 81T>C BstUI Exon 2, 1060+10G>C SmaI Exon 7, 1171G>A StuI Exon 8, 1413G>A DdeI Exon 10, 1617C>T BstNI Exon 11, 1725C>T SSCP Exon 12, 1771C>T HincII Exon 12, 1959 T>C AvaII Exon 13, 2232G>A MspI Exon 15, of application in extra-corporeal and in vitro diagnostic methods, of familial hypercholesterolemia.

4. (Withdrawn) Use of the gene sequence of claim 1 in the design and preparation of oligonucleotides capable of hybridising with any of the following mutations:
(-23)A>C, 1054del11, 108delC, 1197del19, 1207de1T, 1432delG, 191-2delAinsCT, 2184de1G, 231delC, 2399del5/ins4, 313+1insT, 338del16, 509insC, 675del15, 684dup12, 941-39 C>T, C195R, C255G, C319Y, D157G, D630N, E291X, H635N, N59K, T41M, W515X, Y379X, Y421X, T433N, 818de18, 1423delGC/insA, 1204insT, 451de13, G516X, 2389+4A>G, 1815del11, 1186+5G>A, T740M, I771T, R279G, T446I, H562Q, C74Y, D686Y, G(-2)R, E579D, S205C, D200V, V766E, L(-6)P, 2544insC, C42Y, 2389+3A>C, [1587-5de15;1587del31].

5. (Withdrawn) Oligonucleotide probes capable of hybridising with any of the mutations comprised in the gene sequence of claim 1.

6. (Withdrawn) Oligonucleotide probes according to claim 5 selected from between at least one of the following SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:24, SEQ ID NO:29, or at least one from between SEQ ID NO:37 to SEQ ID NO:147 or from between SEQ ID NO:154 to SEQ ID NO:259.

7. (Cancel)

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9. (Withdrawn) Assay kit comprising a support to which any of the oligonucleotide probes of claim 5 are coupled, of application in the diagnosis of familial hypercholesterolemia.

10. (Withdrawn) Assay kit comprising a support to which any of the oligonucleotide probes of claim 6 are coupled, of application in the diagnosis of familial hypercholesterolemia.

11. (Withdrawn) Use of any of the oligonucleotide probes selected between: SEQ ID NO: 2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO: 9, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:153 in an extracorporeal method of in vitro detection of LDL-r gene mutations for the diagnosis of familial hypercholesterolemia.

12. (Withdrawn) Assay kit according to either of claims 9 or 10 comprising a support to which moreover any of the oligonucleotide probes are coupled selected from between: SEQ ID NO: 2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO: 9, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:152, SEQ ID NO:153 of application in the diagnosis of familial hypercholesterolemia.

13. (Cancel)

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15. (Currently Amended) Extracorporeal method of *in vitro* diagnosis of familial hypercholesterolemia, comprising detecting in a biological sample that comprises nucleic acids of subject from which the sample was obtained ~~of an individual~~ at least one mutation in SEQ ID NO:1 selected from (-23)A>C, 1054del11, 108delC, 1197del19, 1207del1T, 1432delG, 191-2delAinsCT, 2184del1G, 231delC, 2399del5/ins4, 313+1insT, 338del16, 509insC, 675del15, 684dup12, 941-39 C>T, C195R, C255G, C319Y, D157G, D630N, E291X, H635N, N59K, T41M, W515X, Y379X, Y421X, T433N, 818de18, 1423delGC/insA, 1204insT, 451de13, G516X, 2389+4A>G, 1815del11, 1186+5G>A, T740M, I771T, R279G, T446I, H562Q, C74Y, D686Y, G(-2)R, E579D, S205C, D200V, V766E, L(-6)P, 2544insC,

C42Y, 2389+3A>C, [1587-5del5;1587del31] wherein the presence of the nucleotide content is indicative of a diagnosis of familial hypercholesterolemia.

16. (Currently Amended) Method of diagnosis according to ~~claims 13 to 15~~ claim 15, comprising amplifying DNA fragments that contain at least one mutation of the mutations of SEQ ID NO:1 ~~claim 1~~ alone or in combination with ~~the~~ a mutation selected from ~~of claim 2~~ 2393del9, (-42)C>G, (-49)C>T, 1045delC, 1061-8 T>C, A378T, C358R, 1358+1G>A, 1706-10G>A, 1845+1G>C, 2085del19, 2lldelG, 2140+5G>A, 2207insT, 2390-1G>C, 313+1G>C, 313+1G>A, 518delG, 7delC, 872delC, 884delT, 920ins4, A519T, C113W, C255X, C281Y, C297F, C347Y, C371X, C646Y, C677Y, C68W, C74G, C95R, D151N, D200G, D200Y, D280G, E10X, E246A, E256K, F634L, G322S, G352D, G571E, N543H, N804K, Q12X, Q133X, Q357P, Q427X, Q71E, R395Q, R574W, R612C, S156L, S205P, T413K, T7051, V502M, W(-18)X, W541X, D679E, 1359-1G>A, C127R, 681ins21, C122X, V408M, G528D, D412H, N619N, E80K, L534P, L621S, C356Y, R329X, G248D, C201Y, 313+5G>A, C358Y, C331R, D157N, V776M, P664L, W462X, Q328X, L584P, R395W, G314V, W469X, P678L, R612H, R236W,and/or ~~the polymorphisms of claim 3~~ a polymorphism selected from 81T>C BstUI Exon 2, 1060+10G>C SmaI Exon 7, 1171G>A StuI Exon 8, 1413G>A DdeI Exon 10, 1617C>T BstNI Exon 11, 1725C>T SSCP Exon 12, 1771C>T HincII Exon 12, 1959 T>C AvaII Exon 13, 2232G>A MspI Exon 15, by the technique of the chain reaction of the polymerase (PCR), utilizing therefor any of the oligonucleotides selected between SEQ ID NO:2 to SEQ ID NO:259 or combinations of the same, subjecting the PCR products to an analysis by the simple chain conformation polymorphisms technique (SSCP), sequencing those fragments having an anomalous pattern

by SSCP to detect the mutations that would be identified subsequently by restriction analysis or by means of ~~the~~ an assay kit ~~of claims 9, 10 or 12~~.

17. (Currently Amended) Extracorporeal method, according to claim 15, comprising use of oligonucleotides capable of hybridizing with any of the mutations in SEQ ID NO: 1 ~~the gene sequence of claim 1~~ selected from at least one of a) SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:24, and SEQ ID NO:29, b) SEQ ID NO:37 to SEQ ID NO:147 or c) SEQ ID NO:154 to SEQ ID NO:259.

18. (Withdrawn) An assay kit for diagnosis of familial hypercholesterolemia comprising a support to which any of the oligonucleotides of claim 17 are coupled.

19. (Currently Amended) Extracorporeal method of *in vitro* diagnosis of ~~familiar~~ familial hypercholesterolemia comprising detecting in a biological sample that comprises nucleic acids of subject from which the sample was obtained at least the mutation of 313+1insT in SEQ ID NO:1 wherein the 313+1insT mutation is detected by detecting the presence of at least one of SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58 and SEQ ID NO:59 in the junction of exon 3 and intron 3 in the low density lipoprotein receptor (LDL-r) gene wherein the presence is 313+1insT is indicative of a diagnosis of familial hypercholesterolemia.

20. (Cancel)

21. (Withdrawn) Extracorporeal method, according to claim 19, comprising detecting in a biological sample of an individual the mutation 313+linsT in combination with the mutation 313+1G>C in SEQ ID NO:1.

22. (Withdrawn) Extracorporeal method, according to claim 20, comprising detecting in a biological sample of an individual the mutation 313+linsT in combination with the mutation 313+1G>C in SEQ ID NO:1.

23. (Withdrawn ) Extracorporeal method, according to claim 19, comprising detecting in a biological sample of an individual the mutation 313+linsT in combination with the mutation Q71E in SEQ ID NO:1.

24. (Withdrawn ) Extracorporeal method, according to claim 20, comprising detecting in a biological sample of an individual the mutation 313+linsT in combination with the mutation Q71E in SEQ ID NO:1.

25. (Withdrawn) Extracorporeal method, according to claim 19, comprising detecting in a biological sample of an individual the mutation 313+linsT in combination with the mutation 313+1G>C and the mutation Q71E in SEQ ID NO:1.

26. (Withdrawn) Extracorporeal method, according to claim 20, comprising detecting in a biological sample of an individual the mutation 313+linsT in combination with the mutation 313+1G>C and the mutation Q71E in SEQ ID NO:1.